

CLAIMS

I claim:

- 5 1. An external cavity tunable laser comprising:
a frequency-tuning device configured as an Acousto-optical cell including a first and a second Acousto-optical diffraction means having a narrow-band optical filtering Bragg grating; and
10 an etalon having spectral characteristics for cooperating with said frequency-tuning device to increase a side-mode suppression ratio of said tunable laser.
- 15 2. The external cavity tunable laser of claim 1 wherein:
said etalon having a fineness greater than or equal to 10.
- 20 3. The external cavity tunable laser of claim 1 wherein:
said etalon is spectrally aligned with a telecommunication ITU grid.
- 25 4. The external cavity tunable laser of claim 1 wherein:
said etalon is disposed immediately before said frequency tuning device along an optical path of said tunable laser.
- 30 5. The external cavity tunable laser of claim 1 wherein:
said etalon is disposed immediately after said frequency tuning device along an optical path of said tunable laser.
- 35 6. The external cavity tunable laser of claim 1 wherein:
said first Acousto-optical diffraction means comprising a first Acousto-optical crystal and said second Acousto-optical diffraction means comprising a second Acousto-optical crystal.

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7. The external cavity tunable laser of claim 1 further comprising:
a reflection mirror driven by a PZT assembly to reflect a beam
projected from said Acousto-optical cell back to transmit
therethrough again.
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8. The external cavity tunable laser of claim 1 further comprising:
a first electrode connected to said first Acousto-optical
diffraction means and a second electrode connected to said
second Acousto-optical diffraction means.
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9. The external cavity tunable laser of claim 1 wherein:

said first and second Acousto-optical diffraction means having
diffraction phase gratings for intra-cavity narrow-band
wavelength filtering.
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10. The external cavity tunable laser of claim 8 wherein:

said first electrode is connected to an RF signal for tuning a
central frequency of said narrow band Bragg grating.
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11. The external cavity tunable laser of claim 8 wherein:

said second electrode is connected to a second electric source to
provide a second order filtering for compensating a wavelength
shift.
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12. The external cavity tunable laser of claim 1 further comprising:

a collimated laser source for projecting a collimated optical
signal of specific wavelength through said Acousto-optical cell.
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13. The external cavity tunable laser of claim 1 wherein:

said first and second Acousto-optical diffraction means are
formed as a first column and a second column respectively in a
single Acousto-optical crystal.

14. The external cavity tunable laser of claim 1 wherein:
said first and second Acousto-optical diffraction means are
formed as a first column and a second column respectively in a
Lithium Niobate (LiNbO_3) crystal.
15. The external cavity tunable laser of claim 1 wherein:
said first and second Acousto-optical diffraction means are
formed as a first column and a second column respectively in a
Tellurium Dioxide (TeO_2) crystal.
16. The external cavity tunable laser of claim 1 wherein:
said first and second Acousto-optical diffraction means are
formed as a first column and a second column respectively in a
birefringent crystal having a predefined responsiveness to an
radio-frequency (RF) driven signal.
17. The external cavity tunable laser of claim 1 wherein:
said first and a second Acousto-optical diffraction means having
said narrow-band optical filtering Bragg grating further
comprising a surface acoustic wave (SAW) grating.
18. An external cavity tunable laser comprising:
a frequency-tuning device configured as an Acousto-optical cell
and a reflection means for forward and backward transmitting
an optical beam through said Acousto-optical cell for generating
an optical beam with zero-wavelength shift and at least twice
filtered by said Acousto-optical cell; and
an etalon for cooperating with said frequency-tuning device to
increase a side-mode-suppression-ratio of said tunable laser.

19. The external cavity tunable laser of claim 18 wherein:
said etalon having a fineness greater than or equal to 10.
- 5 20. The external cavity tunable laser of claim 18 wherein:
said etalon is spectrally aligned with a telecommunication ITU grid.
- 10 21. The external cavity tunable laser of claim 18 wherein:
said etalon is disposed immediately before said frequency tuning device along an optical path of said tunable laser.
- 15 22. The external cavity tunable laser of claim 18 wherein:
said etalon is disposed immediately after said frequency tuning device along an optical path of said tunable laser.
- 20 24. The external cavity tunable laser of claim 18 wherein:
said Acousto-optical cell further comprising a first and a second Acousto-optical crystal.
- 25 25. The external cavity tunable laser of claim 24 wherein:
said Acousto-optical cell further comprising a first and a second Acousto-optical diffraction means disposed in an Acousto-optical crystal.
- 30 26. The external cavity tunable laser of claim 24 wherein:
said Acousto-optical cell further comprising a first and a second Acousto-optical diffraction columns respectively disposed in an Acousto-optical crystal.
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27. The external cavity tunable laser of claim 24 wherein:
said first and second Acousto-optical cells are formed as a first column and a second column respectively in a birefringent crystal having a predefined responsiveness to an radio-frequency (RF) driven signal.
28. The external cavity tunable laser of claim 24 wherein:
said first and a second Acousto-optical cells having said narrow-band optical filtering Bragg grating further comprising a surface acoustic wave (SAW) grating.
29. An external cavity tunable laser comprising:
a frequency-tuning device configured as a non-collinear Acousto-optical cell having an acoustic wave propagates almost perpendicular to an optical transmission therethrough; and
an etalon cooperating with said frequency-tuning device for increasing a side-mode-suppression-ratio of said tunable laser.
30. A method for tuning a laser comprising:
tuning said laser by a frequency-tuning device configured as a non-collinear Acousto-optical cell having an acoustic wave propagates almost perpendicular to an optical transmission therethrough; and
employing an etalon of a specific fineness to cooperate with said frequency-tuning device for outputting an optical signal with an increased a side-mode-suppression-ratio (SMSR).
31. The method for tuning a laser of claim 30 further comprising:
forming said frequency-tuning device as a first and a second Acousto-optical diffraction cells and employing said etalon with a fineness equal to or greater than 10.